

1 IN-LINE CHROMATIC HARP WITH AN ADJUSTABLE STRING
2 GUIDE

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4 An in-line chromatic harp is a string instrument
5 which has the entire twelve semitones in an octave,
6 like the piano, and therefore versatile in music
7 performance. Its strings, like most harps, are
8 arranged in one line. Since in each octave of the
9 in-line chromatic harp has twelve strings instead of
10 seven in conventional harp, the string spacing is
11 narrower so that each octave will not become too wide
12 for the hands of harp player. There are chromatic
13 harps designed with two rows of strings, either
14 parallel or cross each other to preserve the string
15 spacing of conventional harp. These harps had their
16 position in the history and have been around for
17 centuries.

18 This invention relates to an in-line chromatic
19 harp with a string guide which allows the player to
20 quickly identify the proper string position. This
21 string guide is also adjustable to allow the player
22 to play music in any key on the chromatic scale as if
23 playing in "C". In fact, if one can sing in Do, Re,
24 Mi, Fa, Sol, La, Ti, Do, he can play this harp. This
25 makes learning how to play this harp a lot easier
26 than piano, especially if the music is composed in a
27 key other than "C" with many sharps or flats

1 The advantage of an in-line chromatic harp is
2 that every one of the twelve semitones in each octave
3 are accessible from the finger tips without any
4 additional mechanical movement such as pushing a foot
5 pedal or moving a lever, which is the standard
6 practice for harp playing. For example, the concert
7 harp requires the player to push one of several
8 pedals in order to play a # or b (sharp or flat)
9 note. For lever harp, the player has to flip a lever
10 to achieve the same result. This requires skill and
11 planning. It also limits the music one can play and
12 often the music may need to be rearranged to suit the
13 instrument.

14 The in-line chromatic harp is not without
15 problems or difficulties. The most difficult problem
16 is that the string spacing are generally narrower
17 than the conventional harp and the standard red for
18 "C" string and blue for "F" string color code is no
19 longer adequate for the purpose of indicating the
20 string position because there are too many strings in
21 between. The regular harp has only two white strings
22 between the red string and blue string, and three
23 white strings between blue string and red string;
24 therefore, there is no difficulty in identifying the
25 location of any note or string. On the other hand,
26 the in-line chromatic harp, if using the same color

1 code to identify "C" and "F", there will be four
2 narrowly spaced white strings between the "C" and
3 "F", and six narrowly spaced white strings between
4 the "F" and "C". This arrangement becomes rather
5 difficult to play because of the multiple numbers of
6 closely spaced strings.

7 One inventor proposed in patent # 2,137,160 that
8 a guide to be set just behind the string with the
9 same white and black key arrangement like the piano
10 key so that anyone skilled in the piano or organ can
11 readily acquire proficiency in playing that harp.

12 This invention goes one step further so that
13 even anyone not skilled in the piano or organ can
14 acquire proficiency in playing my in-line chromatic
15 harp with the adjustable string position guide.

16 The advantages of this invention will
17 hereinafter become more readily apparent from the
18 following specification of which the drawing forms a
19 part, and wherein:

20 Figure 1 is a full side view of the invention,
21 where the pillar 11, neck 12, sound box 13, and the
22 strings 9 and bridge pin 18 are typical of a Celtic
23 folk harp. The adjustable string position guide 14,
24 is shown installed a small distance C behind the
25 strings as shown on figure 2 so the present of this

1 guide will not interfere the vibration of strings.
2 The adjustable string position guide is mounted on
3 the harp at an angle A to the string as shown in
4 figure 1. This position is right above the proper
5 finger position for playing the harp so the string
6 position is easily identified with this arrangement.

7 Figure 2 is a sectional view of section 2-2.
8 Only the cross section of the adjustable string
9 position guide 14 is shown here at a small distance C
10 behind the strings 9. The adjustable string position
11 guide depicted here is a square bar or a four sided
12 bar. The bar can be a triangle or hexagon and the
13 same principle applies. For the sake of simplicity,
14 from now on a square bar will be used in this
15 specification except where further clarification is
16 necessary.

17 Figure 3 shows the adjustable string position
18 guide 14 with the pivot/slide pin 15a and 15b which
19 are fastened on the harp pillar and neck as shown on
20 figure 1, and the corresponding pivot/sliding hole
21 16a and 16b which are drilled into the ends of the
22 adjustable string position guide 14. On each side of
23 the bar there are multiple dots of different color
24 spaced at a special pattern which will be described
25 later. Since the guide 14 is not perpendicular to
26 the string, the string spacing L on the guide 14 is
27 the true string spacing S , as shown on figure 1,

1 multiplied by the inverse sine of the angle \mathbb{A} ,which
2 defined by the string and the string position guide
3 as shown on figure 1. Since the string spacing on
4 this harp is constant throughout the whole range,
5 this is different from most harps, and therefore the
6 string position guide can slide up and down without
7 mismatching the color dots position to the string as
8 we will see later the significance of this feature.

9 The color dot layout details of the square bar
10 are shown on figure 4. The four sides are being put
11 side by side to show the inter relationship of the
12 dot pattern.

13 On the first side of the square bar 14a, the
14 color dots are arranged in the following way:

15 First dot is red and is located at distance \mathbb{L}
16 from the left end. The second dot is white and is
17 located at distance $2\mathbb{L}$ from the first dot. The third
18 dot is also white and located at distance $2\mathbb{L}$ from the
19 second dot. The fourth dot is blue and located at
20 distance \mathbb{L} from the third dot. The distance between
21 fourth and fifth is $2\mathbb{L}$, fifth and sixth is $2\mathbb{L}$, and
22 sixth and seventh is $2\mathbb{L}$. The distance between
23 seventh and eighth is \mathbb{L} . The spacing repeats itself
24 for the rest of the surface; in this case, three
25 times. However, this should not be the limit and it
26 depends on how many octaves the harp has. As it is
27 shown on figure 4, the first red dot represents the

1 position for Do, the second dot for Re, the third dot
2 for Mi, the fourth dot, a blue dot for Fa, the fifth
3 dot for Sol, the sixth dot for La, and the seventh
4 dot for Ti, and the eighth dot, a red dot again, back
5 to Do of one octave higher. This color code
6 arrangement is the same as a standard harp string
7 color code, that is two white strings between red and
8 blue string and three white strings between blue and
9 red string and this makes the learning transition
10 from a standard harp to this new in-line chromatic
11 harp fairly easy.

12 The side **14a** is the first side of four sides
13 which can be used for string position guide. The
14 second side **14b**, the third side **14c**, and the fourth
15 side **14d** can be switched into position by turning the
16 square bar on its pivots **15a** and **15b** within the holes
17 **16a** and **16b** as the arrows indicated in figure 2.

18 On the second side **14b**, the dot spacing pattern
19 is the same as **14a** except the first red dot is
20 shifted a distance of **3L** to the right as shown in
21 figure 4. On the third side **14c**, the first red dot
22 is shifted a distance of **6L** to the right as shown in
23 figure 4. On the fourth side **14d**, the first red dot
24 is shifted a distance of **9L** to the right as shown in
25 figure 4. (If the guide is a triangular bar the red
26 dot lateral shift will be **4L** from one side to the
27 next side. If the guide is a hexagon bar the red dot

1 lateral shift will be $2L$ from one side to the next
2 side.)

3 It becomes apparent that by turning the string
4 position guide 14, 90 degree from one side to the
5 next side, the position of "Do" is shifted up or down
6 three half-tones depends upon the direction of
7 turning. (If the adjustable string position guide is
8 a triangular bar, the turning will be 120 degree, and
9 if the guide is a hexagon bar, the turning will be 60
10 degree.)

11 The string position guide itself is held by two
12 pivot pins 15a and 15b inside the holes 16a and 16b.
13 The holes are deep enough so that the guide 14 can
14 slide axially up and down by at least three L as
15 shown by arrow 17 on figures 1 and 3. This allows
16 the first red dot or "Do" to be set at any of the
17 three positions at each side of the string position
18 guide. (If the guide is a triangular bar, the axial
19 movement will need to be at least four L , if the
20 guide is a hexagon bar, the movement will need to be
21 at least $2L$.)

22 The result of this arrangement will allow "Do" on
23 this string position guide to be placed at any one of
24 the twelve possible positions of the chromatic music
25 scale required by music.

26 Since the pattern of the dot arrangement on all
27 four sides are the same except it is shifted right or

1 left, the finger position, once learned by the
2 player, would be the same no matter what "key" the
3 music is written. This is a tremendous
4 simplification in playing music. In fact, this makes
5 playing this in-line chromatic harp a lot easier than
6 learning how to play piano, especially for music
7 composed in a "key" other than "C Major" with many
8 sharps or flats. This is an instrument for the
9 amateur to play like a professional without a long
10 and tedious learning process.

11 The color dot pattern on the adjustable string
12 position guide can be made in black and white just
13 like the piano keyboard as it was described in patent
14 # 2,137,160 and shift three half-tone from one side
15 to the next side and achieve the similar result
16 mentioned in the previous paragraph for one who are
17 skilled in piano or organ to simplify the music
18 playing and avoid the complication of using black
19 keys unnecessarily when the music is not written in
20 "C major".

21 A special color mark (red is preferred in this
22 case) is placed on the bridge pin 18 as depicted on
23 figure 1, of the middle C string to identify the
24 starting reference point of the adjustable string
25 position guide.

26 The beauty of this invention is that there is no
27 mechanical motion to change the string length to

1 achieve semi-tones like either the pedal harp or the
2 lever harp. To slide the guide up or down a fraction
3 of an inch, or to turn the guide around its pivot is
4 very simple without even touching the string and yet
5 the chromatic music scale is transposed up and down
6 at the player's wish with minimal effort.

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